

U.S. Patent Application Serial No. **10/527,699**
Response filed September 1, 2006
Reply to OA dated June 2, 2006

REMARKS

Claims 1-20 are pending in this application. The present amendment amends claims 1, 4, 5-10, 19 and 20. Upon entry of this amendment, claims 1-20 will be pending.

The Applicant respectfully submits that no new matter has been added. Support for the amendments to the claims is discussed below. It is believed that this Amendment is fully responsive to the Office Action dated **June 2, 2006**.

The abstract of disclosure is objected to because it refers to the purported merit of the invention. (Office Action paragraph no. 1)

The objection is overcome by the amendment to the abstract, deleting the last sentence of the abstract.

Claims 4, 5, 8-10, 19 and 20 are objected to because of informalities. (Office Action, paragraph no. 2)

The objection is overcome by the amendments to the claims.

The Examiner requests that in claims 19 and 20, Applicant insert --a-- or --an-- after "A method for." For clarity, claim 19 has been amended to recite: "A method for performing a substitution." Claim 20 has been amended to recite "A method for performing an oxidation reaction"

U.S. Patent Application Serial No. 10/527,699
Response filed September 1, 2006
Reply to OA dated June 2, 2006

The Examiner states that: "In claims 4, 5, 9 and 10, "kind of a" begs the question of what makes two things of the same "kind," hence "kind of a" should generally be canceled in these claims" Applicant has amended these claims as suggested. Applicant notes in this regard that the recitation of "kinds of monomers" had referred to different chemical compounds, and not merely to more than one molecule.

The Examiner refers to an open bracket in claim 8, second page. However, Applicant is unsure which bracket the Examiner is referring to, and no amendment has been made in this regard.

The Examiner requests that in claim 8, second page, fourth line after the structure, Applicant change "an" to –the– since the aromatic ring must exist; likewise with the third line on the following page. Claim 8 has been amended as requested.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claims the subject matter which applicant regards as the invention. (Office Action, paragraph no. 3)

1) The Examiner states that the phrase "physically carried" in claim 1 is indefinite.

The rejection of claim 1 is respectfully traversed, and reconsideration is requested.

Applicant submits that the term "physically carried" is adequately defined by the present specification. In particular, this phrase is defined on page 34, line 24:

U.S. Patent Application Serial No. 10/527,699
Response filed September 1, 2006
Reply to OA dated June 2, 2006

"The above physically carrying state is different from carrying by so-called chemical bond such as an ionic bond, and is simply fixation (carrying), that is, state that a palladium catalyst is sandwiched or enveloped by molecular chains of a straight chain organic polymer compound."

The specification also states on page 35, line 19:

"The state of physically carrying in the palladium catalyst is a network structure formed by crosslinking [sic] the polymer as a carrier. The network structure gives stronger physical fixation (carrying) of a palladium catalyst than the above mentioned physical carrying of a metal catalyst given by a straight chain polymer compound."

The specification also gives the method of making the catalyst composition, in which the organic polymer and the palladium catalyst are homogenized in a solvent and then deposited and crosslinked.

That is, the specification distinguishes the term "physically carrying" from "carrying." The term "carrying" itself is defined as "fixation," which means being bound or adsorbed, to the polymer. The specification indicates that "physically carrying" means that the fixation is by **sandwiching** or **enveloping**, and **not** by formation of a direct chemical bond to the polymer.

Applicant submits that the definition of the term "physically carrying" in the specification adequately defines the term in the claims.

2) The Examiner states that in claim 6, lines 1-2, "the crosslinkable functional group" lacks antecedent basis.

The rejection of claim 6 is respectfully traversed, as Applicant argues that there is antecedent basis for "the crosslinkable functional group." Applicant notes that claim 6, which depended ultimately from claim 4, has been amended to depend only from claim 4, but that this does not

U.S. Patent Application Serial No. 10/527,699

Response filed September 1, 2006

Reply to OA dated June 2, 2006

change the scope of claim 6. Claim 4 recites two possibilities, and in either possibility there must be "a monomer having a crosslinkable functional group," and therefore there is antecedent basis for the term in claim 6.

3) The Examiner states that it is not clear what the basis of the ratio is in claim 7.

The rejection of claim 7 is overcome by the amendment to claim 7, which clarifies that the ratio is based on "all monomer units in the whole copolymer." Applicant notes that the phrase "ratio of a monomer **unit**" indicates that monomer **units** are the basis of the ratio; that is, it is a molecule or mole percentage.

4) The Examiner requests use of standard Markush language in claim 8, line 4. Claim 8 has been amended as requested.

5) The Examiner requests that "or" be amended to --and-- in claim 8, line 5. Claim 8 has been amended as requested.

6) The Examiner indicates that the use of "Y" as a variable in claim 8 is confusing, since Y means Yttrium.

The rejection is overcome by the amendment to claim 8. In the text of claim 2 and in formula [2], "Y" is replaced by variable -- Z --. It will be understood that "Z" represents only a variable, and that this amendment does not change the scope of the claim.

7) The Examiner refers to "the above aryl group," which appears three times in claim 8, in monomers (1), (2) and (3), in the phrase "an aromatic ring in the above aryl group or aralkyl group."

The rejection is overcome by the amendment to claim 8, clarifying this recitation.

8) The Examiner states that at the bottom of page 6 (of the preliminary amendment), "arylacyloxy group" lacks antecedent.

This rejection is respectfully traversed. The Examiner refers to the first occurrence of this phrase in the recitation of monomer (3) of claim 8: "an arylacyloxy group having 7 to 15 carbon atoms." Applicant submits that this recitation is an introduction of a possibility for group R¹⁴, and the phrase uses the indefinite article "an." Therefore, there is no lack of antecedent basis.

9) The Examiner states that the term "depositing" in claim 17 is unclear.

The rejection of claim 17 is respectfully traversed. The use of the term "depositing" in claim 17 corresponds to the use of this term in the description of the method in the specification, for example, on page 3, lines 9-14. The meaning of "depositing" can be understood from page 34, line 29: "A composition obtained by filtering a composition deposited in a solvent," That is,

U.S. Patent Application Serial No. **10/527,699**
Response filed September 1, 2006
Reply to OA dated June 2, 2006

"deposited" can be understood to mean "precipitated" from solution. For example, in Example 1 on pages 57, line 21, to page 58, line 1, the polymer and the palladium complex are dissolved, and then hexane is added to "solidify a polymer," i.e., to precipitate or deposit the polymer.

10) The Examiner states that in claims 19 and 20, it is not clear what type of compound is being made.

The rejection of claims 19 and 20 is overcome by the amendments to claims 19 and 20. As amended, claim 19 recites that the method is "to form a compound where the carbon nucleophilic agent substitutes at carboxyl ester position of the allyl carbonate." Support for this amendment may be found on page 47, lines 9-16. Claim 20 recites that the method is "to form a ketone compound corresponding to the alcohol." Support for this amendment may be found on page 48, lines 4-9.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by each of Pittman, Jr. et al., USP 4,258,206 (hereinafter referred to as Pittman), Zoeller et al., USP 6,452,043 (hereinafter referred to as Zoeller), Corain et al., J. Mol. Catal. A: Chemical, vol. 173 (2001), pp. 99-115 (hereinafter referred to as Kralik) and Reactive Polymers, vol.15 (1991), pp.135-145 (hereinafter referred to as Toshima.) (Office Action, paragraph no. 5)

The rejection of claims 1 and 2 is overcome by the amendments to the claims. Reconsideration of the rejection is requested.

Claim 1, as a result of the present amendment, relates to “a catalyst composition comprising a crosslinked organic polymer compound and a palladium catalyst, wherein said catalyst is physically carried on said crosslinked organic polymer compound, prepared by homogenizing a straight chain organic polymer compound having a crosslinkable functional group, and the palladium catalyst in a solvent dissolving said straight chain organic polymer compound, then depositing the composition formed; and subjecting a crosslinkable functional group in said deposited composition to a crosslinking reaction.”

The catalyst composition of the present invention can be obtained by carrying a palladium catalyst on a straight chain organic polymer compound having a crosslinkable functional group, then subjecting it to a crosslinking reaction. When the palladium catalyst physically carried on a straight chain organic polymer compound is further subjected to a crosslinking reaction, the straight chain organic polymer compound in the palladium catalyst composition changes to a polymer having a network structure. This “physically carrying” state is different from carrying by a chemical bond such as an ionic bond or a covalent bond. The network structure gives stronger physical fixation of a palladium catalyst than chemical bond and a covalent bond to result in less leaking of a palladium catalyst (lines 3-8 on page 35 of the present specification), and is clearly different in structure from a chemical bond.

1) Pittman discloses a solid supported catalyst of the formula given in column 4 and the abstract. In this formula, a cross-linked solvent-swellaable resin is a substituent on a

triphenylphosphine ligand of a palladium complex. That is, a covalent chemical bond exists between the resin and the triphenylphosphine, and therefore the palladium complex is held to the resin by a covalent chemical bond. This clearly is different in structure from the present claims, in which the “physical carrying” of the catalyst does not include a chemical bond.

Further, in Pittman the palladium catalyst is bonded to the resin previously crosslinked, namely, the phosphinated resin column 6, lines 56, to column 7, lines 10, and Scheme I in column 7). This method clearly differs from the product-by-process limitation in claim 1, and produces a complex different from that of claim 1. Claims 1 and 2 are not anticipated by Pittman.

2) Zoeller discloses use of “a catalyst having a catalytically effective amount a metal selected from iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, platinum, tin and mixtures thereof associated with a carbonized polysulfonated divinylbenzene-styrene copolymer matrix.” However, Zoeller does not disclose use of a crosslinked polymer, and does not disclose the “physically carrying” as in the present claims, in which a palladium catalyst is carried on a straight chain organic polymer compound having a crosslinkable functional group, then subjected to a crosslinking reaction. Thus, the catalyst having a catalytically effective amount a metal associated with a carbonized polysulfonated divinylbenzene-styrene copolymer matrix, disclosed in Zoeller, is clearly different from the catalyst composition of the present invention. Therefore, claims 1 and 2 are not anticipated by Zoeller.

(3) The Examiner refers to "Corain et al. (2001)" as "Králik." However, since Corain is the first author, and since there is another reference by Králik of record, Applicant will refer to this article as "Corain et al. (2001)" to avoid confusion. Corain et al. (2001) is a **review** article with 84 references on functional resins as designable supports for palladium nanoclusters. The Examiner cites only the abstract, and has not pointed out any particular citation in the article. The abstract does not disclose any specific composition.

Corain et al. discloses ion-exchange, metal coordination by *ad hoc* functionalized resins and homo- or co-polymerization of metal-containing monomers as a method for supporting palladium on a resin, and discloses metallation of anionic resins or cationic resins by ionic bond, at page 104, from 2nd paragraph of left column, to last paragraph of right column. The reference does **not** disclose the "physically carrying" recited in claims 1 and 2, in which a palladium catalyst is carried on a straight chain organic polymer compound having a crosslinkable functional group, then subjected to a crosslinking reaction. Thus, the palladium carried on the resin disclosed in Corain et al. (2001) is clearly different from the catalyst composition of claims 1 and 2, and the present invention is not anticipated by Corain et al. (2001).

(4) In Toshima, the commercial chelate resin (CR-Na) or CR-Mg, which is obtained by exchanging Na of CR-Na to Mg, is mixed with palladium chloride under stirring to immobilize the palladium ions onto the CR complex and obtain CR-Na-Pd or CR-Mg-Pd (3rd paragraph of left column on page 138). However, Toshima does not disclose "physically carrying" or the product-by-

U.S. Patent Application Serial No. 10/527,699

Response filed September 1, 2006

Reply to OA dated June 2, 2006

process limitation of claims 1 and 2, in which a palladium catalyst is carried on a straight chain organic polymer compound having a crosslinkable functional group, then subjected to a crosslinking reaction. Thus, CR-Na-Pd and CR-Mg-Pd are different from the palladium composition of the present invention, and claims 1 and 2 are not anticipated by Toshima.

To summarize, the catalyst composition of claims 1 and 2 is different from the palladium catalyst compositions of the references and the method of production of the palladium catalyst in the product-by-process step of claims 1 and 2 is different from the methods used in making the palladium catalysts in the reference. In addition to the lack of disclosure of these limitations, there is no suggestion or motivation in the references for the product-by-process limitation of claims 1 and 2, nor of the "physically carrying" limitation. Claims 1 and 2 are not anticipated by, and are not obvious over, the cited references.

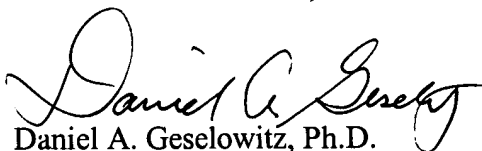
In view of the aforementioned amendments and accompanying remarks, the claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS,
HANSON & BROOKS, LLP



Daniel A. Geselowitz, Ph.D.

Agent for Applicant

Reg. No. 42,573

DAG/bh

Atty. Docket No. **050123**

Suite 1000

1725 K Street, N.W.

Washington, D.C. 20006

(202) 659-2930



23850

PATENT TRADEMARK OFFICE

Q:\FLOATERS\BRENDA\05 Cases\050123_Amendment